

Fostering an Environmental Ethic through Service Learning

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Abstract

Objective: To explore connections between environmental education, public concern for environmental health, and service learning. **Methods:** A 20-item survey was administered to same students at the beginning and end of a 15-week Environmental Health course. Qualitative data were collected from reflective papers based on students involved in community based learning. **Results:** The findings of the study revealed that students grew in their sense of environmental responsibility; significantly increased their “level of concern” for 18 of the 20 environmental variables measured; and viewed community action as empowering. **Conclusion:** Students’ participation in an Environmental Health course and engagement in service learning increased their overall support for a variety of environmental issues.

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According to the Gallup Poll March 2004 issue, only 35% of Americans polled are seriously concerned about what is happening in the environment today (Harper, 2004). In a national study on college students’ environmental attitudes, the researchers found among students at four-year colleges and universities, four out of five are considered non-activists with environmental issues. Among these students, 80 percent are convinced that the environment is deteriorating (Loges & Kidder, 2005). Yet, they would be more likely to participate in environmental activities if they had more information, knowledge or awareness; had more time; or knew it would make a difference.

How can faculty in higher education appeal to the non-activist student? Can environmental activities be promoted in a classroom? How can service learning be used to increase support for environmental protection and health? The purpose of this paper is to explore connections between environmental education, public concern for the environment, and service learning. In the field of environmental health, service learning can be used as a pedagogy with potential for developing an awareness of community needs, a potential for interacting with ethnically diverse groups, and an

opportunity to develop professional skills (Flannery & Ward, 1999).

Methods

This paper is based on both quantitative and qualitative data collected from a classroom-based study of 38 students enrolled in the Environmental Health class during the spring of 2004 at California State University, Chico. CSU, Chico enrolls approximately 16,000 students who are predominantly young, white, and middle class. This undergraduate course is primarily taken by health science majors and minors, but may also be used for the environmental studies majors and minors.

Part I

This first part of the paper is based on a questionnaire administered in an Environmental Health course on the first day of the spring 2004 semester (n=42) and administered again during the last week of class (n=32) to the same students. This in-class study was designed to determine *level of concern* associated with goals of the environmental movement. The 20-item questionnaire is based on the 2000 Gallup poll that measured the level of environmental concern of U. S. residents (Greenberg, 2001). Reliability of the instrument was estimated by

the test-retest method in a pilot study of the questionnaire using students who did not participate in the present study. Analysis of stability based on a two-week test-retest period found no statistical difference in mean response indicating that the survey was stable across time. Since the 1970s, more than two dozen polls have been conducted to measure support for environmental protection and to watch the shift in levels of concern over time. The 13 topics covered by the 2000 Gallup poll questionnaire included air pollution, water pollution, the extinction of plant and animal species, global warming, among other things. The instrument was adapted by adding five additional variables which included recycling and waste management, environmental racism, food quality, pesticides in food, air, and water, and migrant farmworker health and safety. Three additional variables measuring level of importance regarding community cleanups, recycling, and farmers markets were also added. During the course of this study, a new March 2004 Gallup poll (Carlson, 2004) was released and will be used to compare pre and posttest survey results.

This three-unit undergraduate course at CSU, Chico, was designed for health science majors and minors and also includes a service component as part of the syllabus. A central component of the class is a comprehensive project involving fundraising and outreach for a pesticide safety program serving regional migrant farmworkers (Flannery, Portis, & Adame, 2004). Also as part of the course requirements, students must also attend an environmental event on campus, participate in a community clean up, answer lengthy questions based on 70-item reading packet, and complete a reflective paper based on their experiences in the course.

During the first week of class, the pretest frequency data were presented to the students and compared to public concern and support for environmental health based on a 1989 and 2000 Gallup poll (Greenberg, 2001). During the last week of a 15-week course, the posttest was administered and compared to the pretest. Students openly discussed their growing concern

regarding environmental health. Independent samples t-tests were used to compare “pretest” versus “posttest” responses to “How concerned are you about the following?” to 17 dependent variables such as pollution of drinking water and food quality and safety. Independent samples t-tests were used to compare “pretest” versus “posttest” responses to “How important do you feel it is for community action/involvement in the following areas?” to three dependent variables including community cleanups, recycling, and farmers markets.

Part II

The second part of this paper is based on findings from data gathered from the same 38 students in the spring 2004 section of Environmental Health. The data include reflective papers that were analyzed using content analysis. The analysis is based on Riessman’s inquiry-based approach to qualitative data analysis. This technique involved a series of questions applied to the data as a means of narrative analysis. The authors reviewed over 60 pages of data to come up with the themes. In our analysis of the reflective papers, we asked: How did their participation in the migrant farmworker project and the community clean-up help make them better advocates and citizens? How have the community service projects helped students learn more about environmental health in their local community? How have students become more aware of the health issues of migrant farmworkers? How have the class readings, discussions, and service projects enhanced students’ overall environmental awareness or activism? What have they learned about themselves as a result of this course and service projects? These questions defined the subthemes and we organized the data from 30 quotes selected. Further analysis and data reduction of these themes resulted in three general themes that are discussed in the results section.

Results

Part I

The data collected from the 20-item questionnaire yielded Figures 1, 2, and 3. Figure 1 is shown in descending order according to the pretest results comparing the pretest, posttest,

and Gallup poll percent responses to selected questionnaire items. The pretest revealed “pollution of drinking water” received the highest percentage of “great deal of concern” responses prior to the onset of classroom instruction. At that same time, “greenhouse effect or global warming” had the smallest percentage of responses. Surprisingly enough, these responses were representative of the Gallup poll findings; however, the overall percent of “great deal of concern” responses to

the pretest exceeded in the number of “great deal of concern” Gallup poll responses for all questions. When comparing the posttest to the pretest, all questions showed a dramatic percent increase in “great deal of concern” answers with “pollution of rivers, lakes, and reservoirs” and “air pollution” categories at the highest percentage of 97. The lowest percent of “great deal of concern” was 84% was in response to “loss of tropical rainforest.”

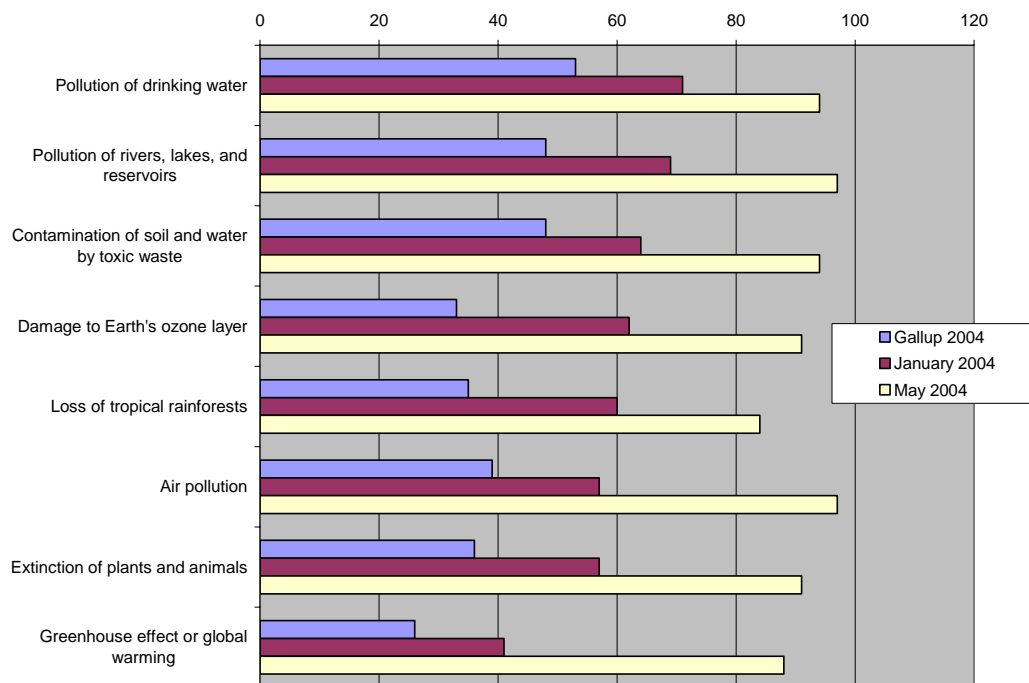


Figure 1
Percent Saying "A Great Deal of Concern"

Figure 2 shows those questions that were not asked by the Gallup poll in 2004, but were added to the student questionnaire based on the Gallup April 2000 poll and the researchers' interests. When placed in descending order by the pretest, it is apparent that “food quality and safety” had the highest percentage of “great deal of concern” answers, while “migrant farmworker health and safety” and “contamination of soil and water by radioactivity” both had the least percentage.

When comparing the posttest to the pretest, all questions showed a dramatic percent increase in “great deal of concern” answers with “pesticides in food, air, and water” at the highest percentage of 100, followed by “food quality and safety,” loss of natural habitat,” and “environmental racism” categories at a percentage of 97. The lowest percent of “great deal of concern” was 81% in response to “contamination of soil and water by “radioactivity.”

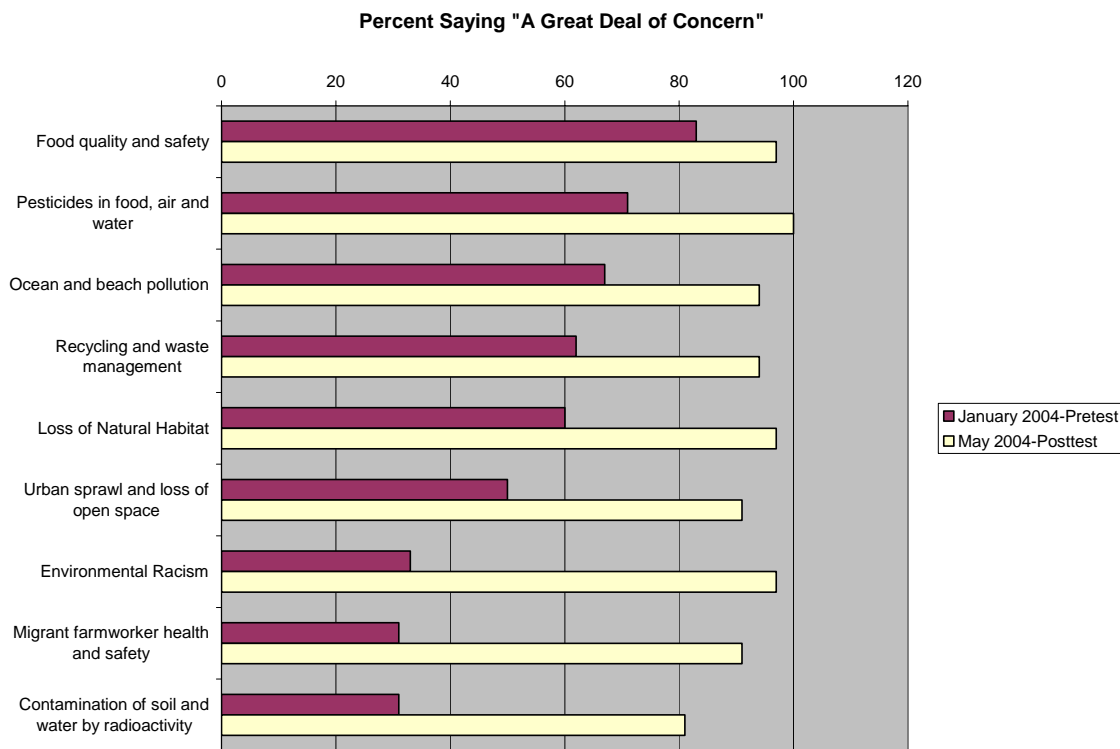


Figure 2
Percent Saying "A Great Deal of Concern"

Figure 3 highlights the responses to the second part of the questionnaire which asked "How important do you feel it is for community action/involvement in the following areas?" Gallup data was not collected on these questions. The data was again organized in descending order by the pretest percentages or respondents reporting "very important." In January, "recycling" received the highest

percentage, followed by "community cleanups" which was further followed by "farmers market." When the same questions were asked in May, there was a marked increased in "very important" responses across the board with "community cleanups receiving 100% "very important" responses. This may be attributed to the fact that the class was required to participate in a cleanup during that semester.

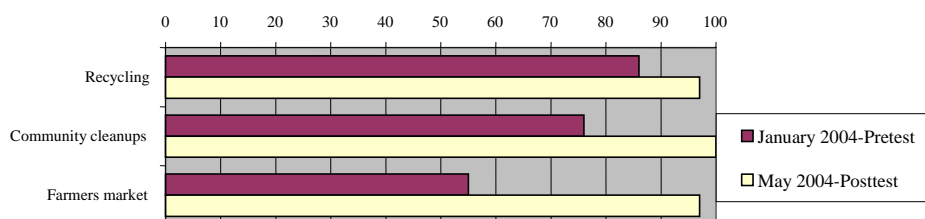


Figure 3
Percent Feel Community Involvement is Very Important in the Following Areas

Table 1
Independent Samples T-Test. Changes in Levels of Environmental Concern* from January 2004 to May 2004 Placed in Descending Order According to the Percent of "Great Deal of Concern" Responses.

	January-04	May-04	<i>Levine's F</i>	<i>p</i> value
	Mean \pm SD (N)	Mean \pm SD (N)		
Food quality and safety Great deal of concern	2.81 \pm .45 (42) 83%	2.9 \pm .18 (32) 97%	16.941	0.065
Pollution of drinking water Great deal of concern	2.71 \pm .46 (42) 71%	2.94 \pm .25 (32) 94%	36.784	0.015
Pesticides in food, air and water Great deal of concern	2.69 \pm .52 (42) 71%	3.00 \pm .00 (32) 100%	92.491	0.001
Pollution of rivers, lakes, and reservoirs Great deal of concern	2.69 \pm .47 (42) 69%	2.97 \pm .18 (32) 97%	81.716	0.002
Ocean and beach pollution Great deal of concern	2.70 \pm .46 (40) 67%	2.94 \pm .25 (32) 94%	41.053	0.011
Contamination of soil and water by toxic waste Great deal of concern	2.64 \pm .48 (42) 64%	2.93 \pm .24 (32) 94%	68.811	0.002
Damage to Earth's ozone layer Great deal of concern	2.59 \pm .59 (41) 62%	2.91 \pm .30 (32) 91%	36.683	0.006
Recycling and waste management Great deal of concern	2.63 \pm .49 (41) 62%	2.94 \pm .25 (32) 94%	72.393	0.002
Loss of Natural Habitat Great deal of concern	2.55 \pm .59 (42) 60%	3.00 \pm .00 (31) 97%	165.195	0.000
Loss of tropical rainforests Great deal of concern	2.55 \pm .59 (42) 60%	2.84 \pm .37 (32) 84%	23.428	0.015
Air pollution Great deal of concern	2.57 \pm .50 (42) 57%	3.00 \pm .00 (31) 97%	1447.233	0.000
Extinction of plants and animals Great deal of concern	2.52 \pm .59 (42) 57%	2.91 \pm .30 (32) 91%	47.812	0.001
Urban sprawl and loss of open space Great deal of concern	2.45 \pm .59 (42) 50%	2.91 \pm .29 (32) 91%	51.756	0.000
Greenhouse effect or global warming Great deal of concern	2.35 \pm .58 (42) 41%	2.90 \pm .30 (31) 88%	37.524	0.000
Environmental Racism Great deal of concern	2.25 \pm .63 (40) 33%	2.97 \pm .18 (32) 97%	50.399	0.000
Contamination of soil and water by radioactivity Great deal of concern	2.20 \pm .64 (41) 31%	2.84 \pm .37 (31) 81%	9.254	0.000
Migrant farmworker health and safety Great deal of concern	2.29 \pm .51 (41) 31%	2.91 \pm .30 (32) 91%	24.557	0.000

Tables 1 and 2 show the results from independent-sample t-tests used to compare pretest and posttest responses to "How concerned are you about the following?" to 17 dependent variables and to compare "pretest"

versus "posttest" responses to "How important do you feel it is for community action/involvement in the following areas?" to 3 dependent variables. For all variables in Table 1, except for food quality, there was a significant

increase in "level of concern" between the two testing periods. In Table 2, a significant increase in "level of importance" was found for community cleanups from the pretest ($M = 2.76$)

to the posttest ($M = 3.00$) and for farmers market from the pretest ($M = 2.50$) to the posttest ($M = 2.97$).

Table 2

Independent Samples T-Test. Changes in Levels of Community Involvement Importance* from January 2004 to May 2004 Placed in Descending Order According to the Percent of "Very Important" Responses.

		January-04	May-04		
		Mean \pm SD (N)	Mean \pm SD (N)	Levine's F	p value
Recycling		2.86 \pm .35 (42)	2.97 \pm .18 (32)	12.788	0.107
	Very important	86%	97%		
Community cleanups		2.76 \pm .43 (42)	3.00 \pm .00 (32)	82.341	0.003
	Very important	76%	100%		
Farmers market		2.50 \pm .59 (42)	2.97 \pm .18 (32)	112.558	0.000
	Very important	55%	97%		

Part II

The qualitative data based on the reflective papers yielded three major themes related to heightened concern about environmental health: 1) the development of an environmental ethic (a deepening sense of environmental responsibility), 2) increased concern regarding migrant farmworker health and pesticide safety, and 3) the role of service learning as an empowering pedagogy.

Development of an Environmental Ethic

The goal of environmental education programs is to lead students to become effective environmental stewards (The National American Association for Environmental Education, 2001). Students' reflections based on their experience in a 15-week Environmental Health course demonstrated an active environmental ethic and commitment to improving local and global health. Megan expressed this in her evaluation of the course:

"My views have definitely changed for the better and I am now more aware, educated, and eager to take a stand on environmental issues in order to make a change. I have grown in my understanding about

environmental topics, I am more interested in participating in projects, and I am more aware of opportunities to help the environment both locally and globally."

Students often feel overwhelmed with their new found environmental awareness and how many problems exist. Opportunities in the course for community service provide students an outlet to direct many of their frustrations. Lisa writes:

"You feel like there is so much wrong and you don't know what to do. When you actually get out there and do something about it, then you feel like you are really advocating change. I have realized how important my environment is to me and how much I am willing to do to protect it."

Another student Amber was motivated to make individual changes and described a personal sense of responsibility even though she too was overwhelmed by magnitude of environmental problems:

"I have found myself making a conscious effort to change the way I live my life. Though at times I felt that there was no chance at making a positive change, I

realized that if I don't try, then I'm not doing my part."

For several students, the service experience and the course readings opened their eyes to not only the environmental health risks to themselves but to the larger local and global communities: Lindsey stated:

"Overall, this class has made me break from my sheltered world and take a look outside and see what's really going on."

Chronic environmental problems such as global warming, water quality, population pressures, and violence can lead to catastrophic public health problems. Many students find themselves compelled to share their new information and experiences with friends and family and seek greater participation in environmental protection. Hailey shares:

"I have to admit, before this class, I had little concern for the destruction of the environment. Now I talk about things affecting our environment all the time to everyone. Spreading the awareness is half the battle. Evoking the passion in people is what moves the world around."

Most of the students felt they were better able to make informed decisions and take action regarding a variety of environmental issues. For example, Julie describes her motivation:

"I have learned so much about myself as a result of this course and the service projects...I am motivated to change my ways and help others change to help our environment."

Kellie was also motivated to translate personal knowledge in action:

"All the information I have learned this semester has not only given me a better understanding of environmental health, but it has given me a better understanding of myself. I have been able to see ways I want to change my lifestyle, and I have begun to take action to make these changes."

By becoming informed citizens, a growing self-respect develops. Lindsey explains:

"I'm a better person because of this class. I'm more eco-friendly and find myself spreading the word on what I learn in class to my family, friends, and especially my roommates. I find myself paying more attention to things that I didn't before."

Throughout the course, students discuss ways to become environmental stewards and the impact of consumption is often addressed. Sara grew in her understanding of lightening her environmental footprint:

"I have just learned so much about myself, and my 'list of important things' is very different than it has ever been before."

Fostering an environmental ethic serves to awaken an enthusiasm in students and strengthens their commitment to protecting public health and the environment.

Concern for Migrant Farmworker Health and Safety

CSU, Chico is located in an agricultural region in the central valley of northern California. Our surrounding towns and counties are temporary homes to thousands of migrant farmworkers. Interestingly, only 31 percent of the students expressed "a great deal of concern" for migrant farmworker health and safety at the beginning of the semester (see Table 1). Sean, an Environmental Studies major owned up to his lack of knowledge regarding migrant farmworkers:

"Learning about and experiencing migrant farmworkers has opened my eyes. I remember looking at the survey at the beginning of the semester and laughing in my head about the migrant farmworker question. I probably put not concerned because I didn't know about any of the issues surrounding them. Coming into this class as an Environmental Studies major, I was already informed in many environmental issues. However, I didn't know anything regarding farm workers."

Participation in a pesticide safety project serving migrant farmworkers has helped students increase their “level of concern” for them. By the end of the semester, 91 percent of the students expressed “a great deal of concern” for migrant farmworker health and safety (see Table 1). Lisa was inspired to get involved and advocate for pesticide safety:

"I feel like my participation in the migrant farmworker project really helped me learn so much more about the needs of our migrant farmworkers; more than I had ever known about. I didn't realize how important pesticide awareness really is, and I never really thought about how much at risk our farmworkers are. Once I understood the issue, I really started to advocate to everyone I know about pesticide safety, and how we can get involved."

“Level of concern” for pesticides in food, air, and water increased from 71 to 100 percent during the 15-week study period. According to Courtney:

"The migrant farmworker project was a key point in this course for me...I am truly distressed that these people have high exposure to such toxic chemicals everyday without sufficient health care."

This service project moved students beyond their campus walls and gave students exposure to people who are different from themselves. Service learning is a way to provide students with academic experiences that allow them to make the necessary links between multiple worlds. These links are especially important on a predominantly white campus. Kelly shares:

"After seeing the young children at the farmworker visit, I am more concerned with pesticide safety than before. The class readings provided me with the knowledge to understand why this is so detrimental, but actually seeing the children's faces made me realize how important it is for the farmworkers to be educated about pesticide safety."

Joanna also expressed the connection of academic study into practice and found the service project meaningful:

"Having the opportunity to actually work with the farm workers has put the meaning of the project into perspective for me."

Lindsay's experience in the farmworker community helped her move beyond the campus walls:

"Before this class I knew nothing about the migrant farmworkers. Truthfully I never really gave it a thought. A new world has been opened to me, one that I didn't know anything about."

Service learning helps students move out of the comfort zones and helps them to take personal risks. Julie reflects:

"I have never participated in any environmental cause before this class. Our Migrant Farmworker Pesticide Action Project was something I probably never would have known about if I were not in this class."

Agricultural work is grueling employment for children and adults in the United States. It is also the least protected and the poorest paid. Farm workers are regularly exposed to pesticides — while mixing or applying pesticides; during planting, weeding, thinning, irrigating, pruning, and harvesting crops; living in or near treated fields; or eating pesticide-contaminated food. As a result, farm workers face greater risk of exposure to hazardous pesticides than any other sector of society. There were over 4,000 cases of farmworker pesticide poisoning reported in California from 1991-1996 (Reeves, Katten, and Guzman, 2002). Farmworkers continue to face unacceptable risks of exposure to dangerous pesticides.

Through our outreach, hundreds of families gained access to more resources by receiving pesticide safety supplies and skills on how to reduce their pesticide risk. Community members felt cared about by the nearby university

students and enjoyed a new learning experience. Students enrolled in this environmental health course gained experience in community outreach, fundraising, and cultural competence. Students boosted self-confidence and strengthened their commitment to environmental health for all. These findings illustrate that the course Environmental Health and the service projects expose students to people and opportunities that would have otherwise remained invisible.

Community Action as Empowering

For some students, service learning merges personal goals, professional aspirations, and higher education. Hailey explains:

"I leave this course refreshed and encouraged that I can make a difference and that it is worth pursuing my current goals and dreams."

Helping students apply classroom learning to community settings is often a foundation for future service. Barbara explains:

"Both experiences [community clean up and migrant farmworker safety outreach] were wonderful to participate in and I'm glad I did because it has influenced me to continue helping others as well as our environment in the future."

Tina agrees:

"Because I enjoyed doing the community service that I was required to do in this class, I will probably continue to participate in community activities in the future, even though it is not required."

It is hard to avoid feeling a sense of doom about the magnitude of environmental problems in our world and current political climate. Service learning is an empowering pedagogy that helps us fight our despair and anger. Alisha reflects:

"I realized that instead of feeling hopeless and small that there are ways that I can help improve environmental awareness. The service projects allowed me to see the reality

of what I had learned about. The service projects inspired me to do more and gave me assurance that I can help in some way."

Angela realized there is so much to do and that every community has environmental problems that need active community members:

"The service learning was probably the most valuable part of the semester. These events taught me that there are environmental opportunities in which to get involved within any community."

People who live near the campus and in the Chico community often speak of a great deal of community pride. Sadie reflected on her community involvement and growing sense of place:

"These events made me realize that working toward a goal for your community helps to develop more pride in your sense of place."

When studying environmental issues, most feel an overwhelming sense of urgency and need for change. Service learning in this course helped Kristen recognize the need for more personal action:

"This class made me realize that environmental actions are an ongoing process. You can't just be active once, if you want to make a difference you need to keep being involved. I have become more aware of the things I can do."

Students engaged in service learning in this course built bridges between their campus, community and region. The course experiences helped them contribute to their community in meaningful ways. Effective service learning is academically relevant to the student while meeting the needs of a particular community group. In this example, students studied migrant farmworker safety and health and participated in a pesticide safety program as well as a community cleanup.

Discussion

Environmental education aims to develop an environmentally literate citizenry that can compete in our global economy; has the skills, knowledge, and inclinations to make well-informed choices; and exercises the rights and responsibilities of members of the community (National Project for Excellence in Environmental Education, 1993). Environmental-based education helps students to feel more confident, to feel part of their community, and to think. Moreover, students who participate in environmental education learn better, are better citizens at school, and transfer their learning to new situations better. The ultimate goal is to give students a better chance to become the best citizens possible (Education and the Environment/ Strategic Initiatives for Enhancing Education in California, 2002).

These findings make clear that students participating in an Environmental Health course that provided opportunities for service learning helped meet the goals of environmental education. In this example, students grew in their sense of environmental responsibility, increased their concern for a group of people that remain largely invisible to most people in the United States, and were empowered to act on their environmental citizenship. Based on survey data, some of the greatest increases in "level of concern" were among environmental issues where students were engaged in service learning. For example, percent ratings in "a great deal of concern" from the beginning of the semester to the end of the semester regarding environmental racism changed from 33 percent to 97 percent; pesticides in food, air, and water changed from 71 percent to 100 percent; and migrant farmworker health and safety changed in value from 31 percent to 91 percent. All of the students (100 percent) by the end of the semester felt community cleanups were very important.

An environmental health course that provides students with opportunities to foster an

environmental ethic, participate in service learning and gain cross-cultural skills attempts to operationalize the late Ernest Boyer's model for the New American College (1994). These objectives combined not only meet the goals of environmental education but the mission of higher education as a whole. Based on his model for higher education, faculty and students are engaged in pursuing scholarly work that addresses the most pressing problems of society, devoted to the advancement of the local community or region, and engaged in experiential learning and co-curricular activities that take abstract ideas and anchors them in real-life problems. Moreover, Boyer advocated the importance of the scholarship of application for the health of our communities and nation (Boyer, 1990).

While the benefits of student participation in environmental advocacy are quite clear, there is still a lack environmental activism in Universities today. In a recent essay, Shellenberger and Nordhaus (2004) argue even though many US citizens are concerned about the environment, they are not concerned enough to take action in environmental issues. So how do we encourage students to get involved? Shellenberger and Nordhaus (2004) suggest we need to connect environmentalism to larger movements for economic and social justice, we also need to address the issues that divide us: race, class, and power. Ultimately, leaders and educators need to rethink their strategy in order to be fully equipped to deal with the myriad of environmental problems which are quickly approaching. Campuses around the nation are including environmental literacy in their curriculum and some colleges have included a Graduation Pledge of Social and Environmental Responsibility (see the web site address: (<http://www.codex.uu.se/texts/humboldt.html>)). This study demonstrates that when students put theory into action, their concern and commitment for the environment grows.

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